Behaviors leading to the occurrence of stomatognathic system disorders among students

(Zachowania prowadzące do powstania zaburzeń układu stomatognatycznego wśród studentów)

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Abstract – Introduction. It is estimated that the appropriate specialist treatment for patients with stomatognathic system disorders is delayed by an average of 6 years. In all these cases, proper health education is of particular importance, reducing the risk of developing stomatognathic system disorders. This belief prompted the authors to undertake their own research.

Aim of the study. The aim of the study was to assess the frequency of behaviors leading to cranial and mandibular dysfunctions and to assess the relationship between the presence of bruxism symptoms or cranio-mandible dysfunction and the occurrence of potentially dangerous types of behavior influencing the proper functioning of the masticatory apparatus.

Material and methods. The study group consisted of 277 people (172 women and 105 men) aged 19 - 29, students of Kraków's universities. An original questionnaire was used and a short physical examination was carried out.

Results. In the group of people suffering from headaches, jaw pain occurred in 80% of cases. 34.5% of people with low muscle tone of the masseter, experience tooth clash , while 65.5% of them lack this symptom. On the other hand, in the group with high tension of masseter muscles, people with grated teeth accounted for 75%, while students who do not use toothbrushes only 35%.

In the group of students with low tension of masseter muscles, only 28.34% wake up during the night.

Tinnitus coexisted with cracks in 69.3%, while in 30.7% the noise was not accompanied by crackling.

Conclusions. Sex had no effect on the relationship between behavior and symptom as well as the relationship between a different constellation of symptom pairs.

In the group of people suffering from headaches the occurrence of jaw pain is statistically significantly more frequent compared to the group who don't. Symptoms of cranio-mandible dysfunctions occur statistically very rarely in the group with low muscle tone of the masseter, while in the group with high muscle tone of masseter, people with gritted teeth constitute a statistically significant majority.

Respondents with low masseter tone tend to wake up statistically significantly more often at night. In turn, cracks often coexist with tinnitus.

qualifications of their members do not affect the final outcome.

Key words **-** disorders of the stomatognathic system, behaviors potentially dangerous for the proper functioning of the masticatory apparatus.

Streszczenie – Wstęp. Szacuje się, że podjęcie właściwego specjalistycznego leczenia u chorych z zaburzeniami układu stomatognatycznego opóźnia się średnio o 6 lat. We wszystkich tych przypadkach szczególnego znaczenia nabiera właściwa edukacja prozdrowotna zmniejszająca ryzyko rozwoju zaburzeń układu stomatognatycznego. To przekonanie skłoniło autorów do podjęcia badań własnych.

Cel pracy. Celem pracy była ocena częstości występowania zachowań prowadzących do powstania dysfunkcji czaszkowo-żuchwowe oraz ocena związków między obecnością objawów bruksizmu lub dysfunkcji czaszkowo-żuchwowej a występowaniem zachowań potencjalnie groźnych dla prawidłowej pracy układu ruchowego narządu żucia.

Materiał i metody. Grupę badaną stanowiło 277 osób (172 kobiety i 105 mężczyzn) w wieku 19 - 29 lat, studentów krakowskich uczelni. Wykorzystano autorską ankietę oraz przeprowadzono krótkie badanie fizykalne.

Wyniki. W grupie osób z bólem głowy, ból szczęki występował u 80%. U osób z niskim napięciem mięśni żwaczy starcie zębów występowało w 34,5% przypadków, natomiast tego objawu było brak u 65,5%. Z kolei w grupie z wysokim napięciem mięśni żwaczy osoby ze startymi zębami stanowiły 75%, podczas gdy studentów bez startych zębów tylko 35%.

W grupie studentów z niskim napięciem mięśni żwaczy wybudza się w nocy tylko 28,34%.
Szumy w uszach współistniały z trzaskami w 69,3% , natomiast u 30,7% szumom nie towarzyszyły trzaski.
Wnioski. Płeć pozostawała bez wpływu na występowanie zależności między *zachowaniem* a *objawem* jak i zależności między *różną konstelacją par objawów.*
W grupie osób z bólem głowy występowanie bólu szczęki jest znamiennie statystycznie częstsze w porównaniu do grupy bez bólu głowy. Objawy dysfunkcji czaszkowo- żuchwowych występują znamiennie statystycznie rzadko w grupie z niskim napięciem mięśni żwaczy, natomiast w grupie z wysokim napięciem mięśni żwaczy osoby ze startymi zębami stanowią istotną statystycznie większość.
Badani z niskim napięciem mięśni żwaczy wybudzają się w nocy znamiennie statystycznie często. Z kolei trzaski istotnie często współistnieją z szumem w uszach.

Słowa kluczowe – zaburzeniami układu stomatognatycznego, zachowania potencjalnie groźne dla prawidłowej pracy układu ruchowego narządu żucia.

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I. INTRODUCTION

Bruxism or cranio-mandibular dysfunction involves a number of ailments. These ailments, more or less characteristic of masticatory system disorders, may present a wide range of symptoms extending beyond the oro-facial region and located outside the chewing organ, e.g. in the cervical spine, temporal, parietal or occipital region, may affect the eyes or hearing organ . The patient often suffers from existing ailments concerning disorders of the stomatognathic system and looks for help from laryngologists, audiologists, neurologists, psychiatrists and ophthalmologists. Often, long-lasting, difficult to verify, high-intensity symptoms are the cause of discomfort and reduced quality of life compounded by the lack of effective therapy.
It is estimated that the appropriate specialist treatment for patients with stomatognathic system disorders is delayed by an average of 6 years. [1-4] In all these cases, proper health education, reducing the risk of developing stomatognathic system disorders, is particularly important. This conviction prompted the authors to undertake their own research aimed at:

- assessment of the frequency of occurrence of behaviors leading to cranial and mandibular dysfunctions,
- assessment of the relationship between the presence of symptoms of bruxism or cranio-mandibular dysfunction and the occurrence of types of behaviors potentially dangerous for the proper functioning of the masticatory apparatus.

II. MATERIALS AND METHODS

Materials

The survey was conducted from March 1 to May 31, 2014 in Krakow. The studied group comprised 277 students of four Cracow universities: Collegium Medicum of the Jagiellonian University, AGH University of Science and Technology Stanisława Staszica, Cracow University of Technology Tadeusz Kościuszko and the Pedagogical University named after National Education Commission (Rectors of Cracow universities were obtained for research). Universities were represented in the study respectively by 66 (Collegium Medicum of the Jagiellonian University), 69 (AGH University of Science and Technology), 74 (Cracow University of Technology) and 68 (Pedagogical University) students. 62% (172 people) of the study group were women. The subjects were aged from 19 to 29 years.

Methods

The survey was voluntary, anonymous and random. It used an original questionnaire containing questions about age, sex, year and field of study and questions about the occurrence of physical symptoms such as: headache, jaw pain, cracks in the temporomandibular joint, tinnitus, tooth fracture for an unclear reason, waking up at night. The subject determined the frequency of occurrence of a given symptom.

The questions concerned the occurrence of various parafunctions, for example: chewing gum, chewing pens - the subject marked the frequency of practicing the paraffin.
In the question assessing susceptibility to stress, the subject had to mark the answer, which according to him best describes his reactions to stressful situations.

The respondent was also assessed by asking questions whether he was a hyperactive person. As an explanation of this term, it is stated that hyperactivity occurs when a person is unable to sit for one full hour without changing his position or performing additional movements.

Another behavior that was asked in the survey was practicing sports, the respondent reported what sports he was practising and how many hours in a week he spent on physical activity.

The further part of the questionnaire concerned the method of feeding in early childhood, the researcher indicated whether he was fed naturally (breast) or by a bottle (there was an answer "I do not know" until the election).

Immediately after the survey a physical examination was carried out. The masseter muscle tension on the trailers and belly was checked - the symmetrical pressure of the muscle attachment sites and the muscular thigh was used.

The subject valued his feeling and gave it weight in the ten-point VAS scale. The masseter muscle tension was examined using the VAS scale to record the results. For the purpose of the analysis, the examined students were divided according to the reported muscle tone of the masseter into 3 groups: low voltage (1-4 on the VAS scale), medium (5-6) and high (7-10).

The range of abduction of the mandible was measured using a 3-finger test; the examined person checked if he was able to open his mouth to such a width as to fit his own 3 fingers (index, middle and ring finger) between the edges of the lower and upper arch teeth. To ensure hygiene during this test, the patient was instructed to use disinfectant.

Then the subject assessed the occurrence of inequalities and swellings on the mucous membrane of the cheeks. He independently checked the inside of the cheeks with his tongue, giving the examiner whether these swellings are present.

Another symptom that was checked in the study was hypermobility - passive thumb pull to the forearm was used. The result was considered positive if the subject managed to touch the forearm with the thumb.

The researcher then assessed the tooth abrasion by comparing the height of the upper canines relative to the upper lateral incisors. If on one side there was an alignment of the height of the canine with the side incisor, a positive sign of clash was considered.

The mandibular abduction pathway was also examined, the subject performed several abortions, giving the examiner the opportunity to assess the course of the stereotypical trajectory. Any non-straight track was treated as a disorder.

Often one of the subjects presented several types of the abduction track, which is why the movement was repeated several times, which allowed to clearly determine how the typical diversion track is going for a given patient. The result of this test was marked on the Farrar diagram.

III. RESULTS

Occurrence of favorable behavior or preventing thecranial skall or bruxism

The study concerned the assessment of certain behaviors that favor or prevent the formation of bruxism or craniofacial dysfunction. These actions together with the prevalence are presented in Table 1.

Table 1. Summary different types of behaviors and their frequency in the studied group

Behaviour	Number	%
Chewing gum	243	87,73
Nail biting, chewing on pens	197	71,12
Physical activity	176	63,54
Susceptibility to stress	146	52,71

The presented data shows that the surveyed students most often admitted to the habit of chewing gum. This parafunction was used by 87.73% of the analyzed group, while 71.12% of them exhibit behavior such as was biting / chewing on, for example, pens and lips.

The distribution of chewing gum frequency in the study group is shown in Table 2.

Table 2. The frequency of gum chewing in the test group

Frequency of chewing gum	Number	%
Very often (1, 5h in a day)	25	9,03
Often (more than 15 minutes a day)	50	18,05
Moderately (several times a week for 15 minutes)	86	31,05
Seldom (2-3 times in a week for 5 min)	82	29,60
At all	34	12,27

The respondents most often chewed gum in a moderately frequent manner - 31.05% and rarely (2-3 times in a week for 5 minutes) - 29.60% of the analyzed group.

The frequency of biting / chewing, e.g. pens and lips in the examined group, is shown in Table 3.

Table 3. Frequency of biting / biting, e.g. pens, lips in the test group

Chewing on pens/lips	Number	%
Every day	55	19,86
Sometimes	197	71,12
Never	80	28,88

71.2% of respondents sometimes chewed on a pen, lips ... and only 19.86% of respondents admitted to cultivate this habit everyday

Feeding methods in early childhood in the examined group are presented in table 4.

Table 4. Feeding methods in early childhood together with the frequency of their occurrence in the study group

Way of feeding	Number	%
Naturally (breast)	210	75,81%
Bottle	34	12,27%
Both ways	20	7,22%
Lack of knowledge of the respondent	47	16,97%

Among the analyzed students, the majority of them (75.81% of respondents) were breastfed in their early childhood, other feeding methods were definitely less common.

Correlation between different types of behaviours that cause suffering and chemical dysfunction and the symptoms

In the further part of the study, a statistical evaluation of the correlation(albo connection) between behavior and symptoms reported by the respondents was made. The influence of gender on the occurrence of the relationship between certain behavior and symptom was also assessed. Our findings indicate that sex remains unaffected by the correlation between behavior and symptom. Also among the pairs analyzed by us, behavior - symptom, no statistically significant compounds were found (Table 5).

Table 5. Behavior-symptom pairs for which there is no statistically significant relationship

Type of Behaviour	Symptom
Wearing braces	Teeth clash
Chewing gum (regardless of frequency)	increased tension of masseter muscles
Physical activity (regardless of the frequency of practicing)	Tension of the masseter muscles
Biting	Tension of the masseter muscles
Biting	Tooth abrasion
Lenght of sleep	Tension of the masseter muscles
Wearing braces	Tension of the masseter muscles
Chewing gum	Symmetry of motion of abduction

Connection between the counterproof of symptoms, regarding the various consequences

In our own research, the influence of sex on the occurrence of dependence between different constellation of symptom pairs was also assessed. Sex still did not have significant statistical impact on the studied relationships.
Next, the coexistence of symptoms was assessed taking into account their different constellations. The existence of a statistically significant relationship was demonstrated only in relation to some pairs of symptoms. These pairs of symptoms are subject to further discussion.

Table 6. Symptom-symptom pairs for which there is a statistically significant relationship of prevalence

Symptom	Symptom
Headache once in a month or more often	Jaw pain once in a month or more often
Tooth abrasion	Tension of the masseter muscles
Waking up at night	Tension of the masseter muscles
Tinnitus	Cracks in the temporomandibular joint

The frequency distribution of the occurrence of headache and jaw pain in the examined group is presented in Table 7.

Table 7. The connection between the occurrence of headache and jaw pain

Symptoms	Prevalence of the symptom (%)	
	Jaw pain	Lack of jaw pain
Headache	80*	20**
Lack of headache	7	93

“ * “ to “**” = p <0.01

The presented data show that in the group of people suffering from headaches, the occurrence of jaw pain is statistically significantly more frequent compared to the group without headache.

The distribution of the correlation between the masseter muscles tension and the occurrence of tooth clash in the study group is presented in Table 8.

Table 8. Connection between masseter muscles tension and occurrence of tooth clash

Symptoms		Prevalence of the symptom (%)	
		Tooth abrasion	
		present	absent
Tension of the masseter muscles	high	75[1/]	25[2/]
	average	46,2	53,8
	low	34,5*	65,5**

„* ” to „** ” = p<0,01
„[1/]” to „[2/]” = p<0,05

The obtained results indicate a significantly less frequent (p <0.01) occurrence of cranio-mandibular dysfunctions in the group with low muscle tone of the masseter, whereas in the group with high muscle tone of the masseter people with grated teeth constitute a statistically significant (p <0.05) majority .

The distribution of the connection between the frequency of waking up at night and the tone of the masseter muscles in the examined group, is presented in Table 9 .

Table 9. The relationship between the frequency of waking up at night and the presence of masseter muscles

Symptoms		Prevalence of the symptom (%)	
		Waking u pat night	
		present	absent
Tension of the masseter muscles	high	56,52	43,48
	average	56,72	43,28
	low	28,34*	71,66**

"*" to "** = p <0.01

In the group of students with low tension of the masseter muscles, only 28.34% wake up during the night (statistically students do not often wake up), while in the group with medium and high muscle tone, almost the same percentage of respondents wake up at night (56.72% with medium voltage and 56.52% with high muscle tone).
The distribution of the connection between the awakening frequency at night and the masseter muscle tone in the study group is shown in Table 10.

Table 10. Correlation between the occurrence of tinnitus and the occurrence of cracks in the temporomandibular joint

Symptoms		Prevalence of the symptom (%)	
		crackling in the temporomandibular joint	
		present	absence
Tinnitus	present	69,3*	30,7**
	absent	47,2	52,8

„* ” to „** “ = p<0,05
Sounds often coexist with tinnitus (p <0.05).

IV. DISCUSSION

In our research, we did not show the importance of gender in shaping the symptoms of masticatory organ dysfunction. Sex remained unaffected by both the connection between different types of behaviors and symptom and the correlation between a various constellation of symptom pairs. In general, there is an opinion that the female sex determines the more frequent occurrence of ailments from the stomatognathic system. This situation is explained by the bigger care about health among women) as well as the greater tendency to destructive changes of connective tissue in the female sex. [5-11]

Our own research did not show statistical connection between the subjective feeling of stress and the increased tension of the masseter muscles as well as the clash of teeth.

However, many authors point out the importance of the increasing mental stress in shaping the pathology of the stomatognathic system. The somatic consequences of stressors are largely dependent on the patient's personality type and the ability to cope with stress. The prolonged action of stressors breaks the adaptive mechanisms of the body and leads to the accumulation of various disorders, including disorders of the stomatognathic system. [12-15].

Often, various specialized research instruments are used to assess the role of stress in shaping morbidity. For example, Pihut and Gierowski [16] used in their research the "Scale to study methods of coping with stress" according to Lazarus and Folkman. We used only the interview collected from the subject to document the role of stress. This fact, however, reveals a significant lack of awareness of their own reaction to the stress of the students we study. Our observations are in line with the opinion of Wigdorowicz-Makowerowa about the lack of perception of stressful situations and the impact of stress on the masticatory system disorders by patients affected by disorders of the stomatognathic system [17].

Our own studies did not show the correlation between the length of sleep and the tension of masseter muscles. Similar observations are made by Jurkowski et al., According to which length and sleep quality are not affected by the occurrence of bruxism [18]. Opposite to these results, however, ---- are Kleinrok studies [19], in which the author showed that the quality disorders of sleep (sleep that gives no rest) occurs in 58% of patients with pain syndrome of masticatory dysfunction. What is more, Ziółkowska-Kochan, also referred to the occurrence of daytime sleepiness in bruxists caused by waking up at night. In this study, 12% of patients had coexisting pain syndrome of masticatory system together with dysfunction of restless legs syndrome [20].

Today, a great importance in the formation of disorders of the stomatognathic system is attached to parafunctions (harmful habits). Abnormal, fixed, atypical activities of the masticatory organ allow for the growth of pathology. Behavior such as ---biting pens, lips, nails or nails around the nails, biting foreign bodies, biting the tongue, biting the mucous membrane is often an attempt to relieve stress causing excessive contraction of the stomatognathic system muscles and long-lasting and nonphysiological load of the system. [10,21-23]

Repeated attempts have been made to prove the connection between the occurrence of parafunctions and the presence of symptoms of craniofacial dysfunction or bruxism. Such attempts often pointed to the lack of statistically significant dependencies. [24-26] In turn, in other studies, the correlation between occlusion defects and the occurrence of symptoms of cranio-mandible dysfunctions was indicated [27].

Bruxism may be accompanied by attention deficit and motor slowness [20], although more frequent anxiety and abundance of movements are observed in Brussels [17,19,28]. Dupas [28] and Makowerowa [17] also draw attention to the increased psychomotor excitability (ie teams running with abundant movements) occurring in patients affected by cranio-mandibular dysfunction. However, our own studies did not confirm the association of hyperactivity with ruminal muscle tone.

Our study is an attempt to cross-sectional analysis of a group of young people in terms of the occurrence of only symptoms of cranio-mandible dysfunction or bruxism. It should be emphasized, however, that knowledge about prohealthy habits that protection against functional disorders of the stomatognathic system is small, even among medical students. According to the authors, much more educational activity among young people is needed in the field of prophylaxis of stomatognathic system diseases.

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